

[30] FIGs 9a, 9b and 9c illustrate embodiments similar to FIGs. 8a and 8b, where the transmissive region comprises a thin film layer structure designed to match to lessen phase mismatch and optical delay hit.

*10a, 10b and 10c*

[31] FIGs ~~10a through 10c~~ illustrate steps in a manufacturing process for the variable add drop filter.

#### Detailed Description

[32] FIG. 1 is an illustration of a hitless wavelength-tunable optical filter 100, in accordance with the teaching of prior art United States Patent 6,292,299. The hitless wavelength-tunable optical filter 100 includes two regions. The first region includes a wavelength-tunable optical filter 110 and the second region, adjacent to the first region, has a broadband optical reflector 120.

[33] The wavelength-tunable optical filter also referred to as the filter region 110 illustrated in the embodiment of FIG. 1 is a multi-layer dielectric wedge filter.

[34] The broadband optical reflector, also referred to as the broadband reflective region, 120 utilized in one exemplary embodiment of the present invention is a thin broadband reflective metallic; coating, such as gold or silver, disposed over a portion of the filter region 110.

[35] The operation of the hitless wavelength-tunable optical filter 100, is now described. Assume that the hitless wavelength-tunable optical filter 100 is included as a component of an add/drop device incorporated within a WDM system having a total of  $p$  wavelength channels included within the incident composite optical signal beam 130. The optical signal beam of a single wavelength channel 140 is shown passing the filter region 110 region, whenever the incident composite optical signal beam 130 strikes the filter region 110. The reflected composite optical signal is not shown. Transition between functionality of the hitless wavelength-tunable optical filter 100 as a bandpass filter and as a broadband reflector is accomplished by changing the point at which the incident composite optical signal beam 130 strikes the device with respect to the x-axis. When